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ABSTRACT

The primary purpose of this study was to demonstrate whether children ages 5 through 8 could learn keyboarding skills. A secondary purpose was to examine the relationship between typing skill development and motor proficiency. A sample of 24 children was randomly selected from a group attending a summer school enrichment program. The Bruininks-Oseretsky Test of Motor Proficiency was used to measure children's gross and fine motor skills. After arm and leg preference for each child had been determined, gross motor, fine motor, and gross and fine motor skills subtests were administered. Subjects used IBM Selectric typewriters and a modified "Touch to Type Typing Program." All instruction was teacher-directed in 30-minute sessions and was continued for 19 days. Each lesson was observed by at least one child development specialist in order to measure time-on-task behaviors and to search for obvious signs of frustration, enjoyment, and perseverance. Results indicated that young children can learn to type correctly and they can do so without frustration. Seven- and 8-year-olds experienced success with words and sentences and stayed with the task; 5- and 6-year-olds progressed to words only. Observations suggested that being able to read was an important antecedent skill. Additional results showed that gross and fine motor proficiency were highly related to the success of the older children. (RH)

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"An Analysis of Young Children Learning Keyboarding Skills"

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Can Children Learn to Type?

"You can give your child a head start in school with a _____ computer."[1]

While the social, philosophical, and educational issues surrounding technology continue to whirl at an increasingly rapid pace in professional and academic circles, computers, word processors, and electronic games are being purchased and placed in as many schools, homes, and businesses as can be afforded. Few people doubt that "the machines" will disappear and persons who are expressing doubt, fears, and sincere reservations have made little dent in the market place.

Children learn to use computers rapidly, and when observed globally, most appear to be heavily engrossed in their operations on them. The questions, however, that seldom has been asked is can young children learn keyboarding skills?[2] Almost everyone now knows that children can use computers, that they can be used for enhancing the basics. The more important question is can they be taught to use them more effectively? If they can develop such skills without undue frustration, are they beneficial to the child's use of a computer? Obviously the first question must be answered before it is possible to investigate the second one. The National Diffusion Network[3] published (in 1982) a review of 23 technology programs indentified as the top ones in the United States. Of the 23 exemplary programs, not one dealt with the appropriate skills necessary to use a computer with maximal effectiveness.

[1] Television commercial, Channel 11, Atlanta, Georgia, November 4, 1983 at 8:30 a.m.

[2] The popular term is "learn to type."

[3] National Diffusion Network, Technology Programs that Work. Chelmsford, MA, 1982. pp. 1-31.

Likewise in 1983, the Educational Testing Service issued its FOCUS 11 [4] and in it was given the major recommendations for "computer literacy" and, again, basic keyboarding skills were omitted from the discussion.

Omar K. Moore[5] singularly studied and documented the potency of the typewriter and the computer for young children in the 1960's. He was far ahead of his time and the work was largely ignored. Even as carefully as that work was conducted, skill in managing the keyboard also was ignored.

Only business-oriented educators have seen the potential potency of touch-typing for children and one group has developed a programmed instructional package.[6,7,8,9]

The major purpose of the study was to demonstrate whether or not five, six, seven, and eight-year-old children could learn keyboarding skills. A secondary purpose was to examine the relationship between typing skill development and motor proficiency.

A sample of 24 children was selected randomly from a summer school enrichment program population of 210. Of them, six were five-year-olds; six were six-year-olds; six were seven-year-olds; and six were eight-year-olds with half being girls.

[4] "Computer Literacy" in FOCUS 11. Princeton: Educational Testing Service. 1983. pp. 1-32.

[5] Omar K. Moore, "Autotelic Responsive Environments and Exceptional Children" Speech delivered to Responsive Environments Foundation, Inc. Hamden, CT September 1, 1986.

[6] Lawrence W. Erikson, "Performance Goals at the Elementary Level," Business Education Forum, November, 1972.

[7] Ronald, and Dianne Seltzer, "Typing Keys Unlock the Doors to Reading Enrichment," Business Education Forum, February, 1978.

[8] Jane Steward and Buford W. Jones, "Keyboarding Instruction: Elementary School Options," Business Education Forum, April, 1983.

[9] Kate Nash and Charlotte Geyer. Touch to Type Typing Program. North Billerica, Massachusetts: Curriculum Associates, Inc., 1983.

The Bruininks - Oseretsky test of Motor Proficiency was used to measure individually the gross and fine motor skills of the 24 subjects. After arm and leg preference of each subject had been determined, two child development specialists administered the following sub-tests:

Gross Motor Skills:

1) Running speed and agility
2) Balance
3) Bilateral Coordination
4) Strength

Fine Motor Skills:

1) Response speed
2) Visual - motor control
3) Upper - limb speed and dexerity

Gross and Fine Motor Skills:

1) Upper - limb coordination

Teaching Techniques

The 24 subjects used IBM Selectric typewriters and a modified Touch to Type Typing Program developed by Nash and Geyer.[10] The audio tapes accompanying the text were not used. All instruction was teacher directed in 30 minute-sessions for 19 days. There were 12-five and six-year-olds in one instructional group and 12-seven and eight-year-olds in the other one.

After the first day, the pattern of instruction used in both groups was as follows:

1) Review previous day's instruction and 30-second review timings.
2) Exercise for sixty seconds by bending and stretching while standing.
3) Type at one's own pace on day's lesson while monitored by instructor and assistant for correct technique.
4) Review of day's learnings.

[10] Kate Nash and Charlotte Geyer. Touch to Type Typing Program. North Billerica, Massachusetts: Curriculum Associated, Inc., 1983.

Each subject's typing sample was collected each day. Thirty second timings were scored for speed and accuracy and recorded on the ninth, fourteenth and nineteenth days.

The goals for the five and six-year-olds were as follows:

1) Use correctly the paper guide, paper bail, cylinger knob, paper release, return key, space bar and on-off cradle.
2) Listen to and correctly follow oral instructions in relationship to touch typewriting.
3) Strike the keys learned by using the touch method at the rate of six gross works per minute on a 30-second timing using a 70-space line with no more than one third of strokes in error.
4) Complete one lesson every four days.

The goals for the seven and eight-year-olds were as follows:

1) Use correctly the paper guide, paper bail, cylinder knob, paper release, return key, space bar, line space indicator, margin levers, shift keys and on-off cradle.
2) Listen to and correctly follow oral instructions in relationship to touch typewriting.
3) Strike the keys learned using the touch method at the rate of ten gross works per minute on a 30-second timing using a 70-space line with no more than one third of strikes in error.
4) Complete one lesson each day.

Each lesson was observed by at least one child development specialist in order to measure time-on-task behaviors and to search for obvious signs of frustration, enjoyment, and perserverance. The two specialists had a 99 percent inter-rater reliability that covered 20 observations.

Results

Tables one, two, three, and four show the results of the rounded average gross words per minute (GWPM) and the average errors on 30-second timings. As can be seen, the older children made fewer errors and were typing words and sentences.

Table 1

Keyboarding Speed and Errors

Five-Year-Olds' Final Observation--Day 19

Rounded Average Gross Words Per Minute (GWPM) and Average Errors on Thirty-Second Timings on Isolated Strokes/Words

Name	Sex	Age	Strokes*		Words**	
			GWPM	Errors	GWPM	Errors
David	M	5	29	9	20	20
Ry	M	4	41	8	23	15
Amy	F	5	25	2	17	2
Gerry	M	5	22	8	14	10
Alexee	F	5	37	1	26	3

* Six sets of strokes = a; sl df fj gh as

** Five words = sad gas ask all fall

SPEED GOAL--87% of exercises were typed at least at the minimum rate of six GWPM

ACCURACY GOAL--93% of exercises were typed with no more than one-third of strokes per exercise as errors

Table 2

Keyboarding Speed and Errors

Six-Year-Olds' Final Observation--Day 19

Rounded Average Gross Words Per Minute (GWPM) and Average Errors on Thirty-Second Timings on Isolated Strokes/Words

Name	Sex	Age	Strokes*		Words**	
			GWPM	Errors	GWPM	Errors
Leigh	F	6	27	2	19	2
Kristy	F	6	24	1	20	1
Josh	M	6	33	10	4	2
Jason	M	6	25	3	22	3

* Six sets of strokes = a; sl dk fj gh as

** Five words = sad gas ask all fall

SPEED GOAL--87% of exercises were typed at least at the minimum rate of six GWPM

ACCURACY GOAL--93% of exercises were typed with no more than one third of strokes per exercise in error

Table 3

Keyboarding Speed and Errors
Seven-Year-Olds' Final Observation--Day 19

Rounded Average Gross Works Per Minute (GWPM) and Average Errors on Thirty-Second Timings on Words/Sentences

Name	Sex	Age	Words*		Sentences**	
			GWPM	Errors	GWPM	Errors
Sam	M	6	16	2	6	2
Jeff	M	7	24	3	10	9
Laura	F	7	19	1	9	1
Beck	M	7	19	2	9	1
Emily	F	7	20	2	6	2
Caitlin	F	7	34	3	13	1

* Words = sad gag hall all half fell shell walk

** Sentences = Ask a lad. Dad had a fall. Hal has a salad. She sells eggs. Al was awake.

SPEED GOAL--82% of the exercises were typed at least at the minimum rate of 10 GWPM

ACCURACY GOAL--100% of the exercises were typed with no more than one third of strokes per exercise as errors

Table 4

Keyboarding Speed and Errors

Eight-Year-Olds' Final Observation--Day 19

Rounded Average Gross Words Per Minute (GWPM) and Average Errors on Thirty-Second Timings on Words/Sentences

Name	Sex	Age	Words*		Sentences**	
			GWPM	Errors	GWPM	Errors
Pam	F	8	23	2	12	1
Leigh	F	8	21	2	9	4
Scott	M	8	26	1	10	2
John	M	8	23	7	12	6

* Words = sad gag hall all half fell shell walk

** Sentences = Ask a lad. Dad had a fall. Hal has a salad. She sells eggs. Al was awake.

SPEED GOAL--82% of the exercises were typed at least at the minimum rate of 10 GWPM

ACCURACY GOAL--100% of the exercises were typed with no more than one third of strokes per exercise as errors

Table five gives the motor proficiency scores and the rank order for each age group.

Table 5

Raw scores and rank order for Fine, and Gross Motor Profiency

	FINE MOTOR	RANK ORDER	GROSS MOTOR	RANK ORDER	TOTAL	RANK ORDER	RANK ORDER TOTAL 5&6 YR OLD	READERS SCORE COLUMN
5 YEAR OLDS								
David	8	1.5	20	1	28	1	1	
Ry	8	1.5	23	2	31	2	2	
Amy	12	4	27	4.5	39	4	4	
Gerry	11	3	27	4.5	38	3	3	
Alexee	16	5	26	3	46	5	5	
6 YEAR OLDS								
Leigh	22	4	35	5.5	57	6	9	
Kristy	14	2	34	4	48	4.5	7.5	
Joshua	13	1	35	5.5	48	4.5	7.5	
Jason	17	3	30	3	47	3	6	
							RANK ORDER TOTAL 7&8 YR OLD	READERS SCORE COLUMN
7 YEAR OLDS								
Sam	18	1	33	3	51	2	2	
Jeff	35	6	34	4.5	69	6	10	
Laura	20	3	34	4.5	54	3	3.5	
Beck	23	4	37	6	60	5	7	
Emily	19	2	31	2	50	1	1	
Caitlin	30	5	29	1	59	4	5.5	
8 YEAR OLDS								
Pam	29	4	36	2.5	65	4	9	
Leigh	23	2	36	2.5	59	2	5.5	
Scott	25	3	38	4	63	3	8	
John	19	1	35	1	54	1	3.5	

Pearson r's and Spearman rho's were performed on each age group to find relationships, if any, between motor proficiency and typing performance. As can be seen in Table 6, statistically significant correlations were not found and a number of inverse relationships appeared. Examination of the previously given descriptive tables shows that one or two extreme scores probably skewed the description.

Table 6

Pearson r's and Spearman rho's for Typing Scores and Motor Proficiency Scores in Five and Six-Year-Olds

	Pearson r	Spearman rho
Fine Motor w/GWPM Strokes	-.25(.25)	-.16(.34)
Fine Motor w/GWPM Words	.1036(.40)	.11(.39)
Gross Motor w/GWPM Strokes	-.33(.19)	-.33(.19)
Gross Motor w/GWPM Words	-.46(.10)	-.53(.07)
Motor Total w/GWPM Strokes	-.32(.21)	-.18(.33)
Motor Total w/GWPM Words	-.22(.29)	-.23(.28)

In Table 7, is spite of the small number in the sample, a number of the correlations were statistically significant.

Table 7

Pearson r's and Spearman rho's for Typing Scores and Motor Proficiency Scores in Seven and Eight-Year-Olds

	Pearson r	Spearman rho
Fine Motor w/GWPM Words	.63(.03)*	.75(.006)*
Fine Motor w/GWPM Sentences	.56(.04)*	.65(.02)*
Gross Motor w/GWPM Words	-.34(.17)	.04(.45)
Gross Motor w/GWPM Sentences	.05(.44)	.09(.39)
Motor Total w/GWPM Words	.43(.11)	.56(.05)*
Motor Total w/GWPM Sentences	.54(.05)*	.55(.05)*

* $p < .05$

The daily observation made by the child development specialists showed the following:

1) Five and six-year-old children strayed from the typing task on the average of every three minutes.
2) Seven and eight-year-old children strayed from the typing task on the average of every six minutes.
3) Each child showed a different pattern of sticking to the task.
4) All children rushed into the room and sat down to begin the lessons with the exception of one child.
5) Signs of overt frustration were missing.
6) Children smiled and chatted informally with the four adults.
7) Environment was task oriented.

Discussion and Conclusions

Clearly young children can learn to type correctly and they can do so without frustration. The seven and eight-year-olds experienced success with words and sentences and stayed with the task whereas the five and six-year olds progressed only to words. Observations led to the view that being able to read was important and the date showed that gross and fine motor proficiency were highly related to the successful seven and eight-year-olds.

Studies are needed to determine the kinds of skills children need in order to deal adequately with key-boards whether they are typewriters or computers. Are children limited in their interactions with machines when proper skills are not developed, and when improper ones are incorporated into their operational schema?

REFERENCES

1 Television commercial, Channel 11, Atlanta, Georgia, November 4, 1983 at 8:30 a.m.

2 The popular term is "learn to type."

3 National Diffusion Network, Technology Programs that Work. Chelmsford, MA 1982. pp. 1-31.

4 "Computer Literacy" in FOCUS 11. Princeton: Educational Testing Service. 1983. pp. 1-32.

5 Omar K. Moore, "Autotelic Responsive Environments and Exceptional Children" Speech delivered to Responsive Environments Foundation, Inc. Hamden, CT. September 1, 1962.

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